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United States Patent [19][11] **Patent Number:** **5,864,343****Naughton et al.**[45] **Date of Patent:** ***Jan. 26, 1999**

[54] **METHOD AND APPARATUS FOR GENERATING THREE DIMENSIONAL EFFECTS IN A TWO DIMENSIONAL GRAPHICAL USER INTERFACE**

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[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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Related U.S. Application Data

[63] Continuation of Ser. No. 114,655, Aug. 31, 1993, abandoned.

[51] **Int. Cl.⁶** **G06T 3/00**

[52] **U.S. Cl.** **345/419**

[58] **Field of Search** 395/119-124, 133-135,
395/326-327, 348-351; 345/473, 419, 327,
349, 439

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[57] ABSTRACT

The graphics applications of a 2-D graphics computer system provide each object to be rendered on a 2-D raster display with a pair of rendering reference coordinates (x and y), and a relative depth value (z). Additionally, the computer system is provided with a library of predetermined 2-D images and sounds, and a number of graphics toolkit routines. As the user "moves", the graphics toolkit routines render selected ones of the predetermined images based on x/z and y/z values of recomputed x and y rendering coordinates and the relative depth value z of the objects, and actuate the sounds if applicable based on their predetermined manners of rendering. As a result, the objects that are further away from the user will move slower than the objects that are closer to the user, thereby introducing the effect of parallax and added realism to the 2-D graphics computer system at a substantially lower cost.

20 Claims, 9 Drawing Sheets

